

REMARKS

By this amendment, Applicants have amended the claims to more clearly define their invention. In particular, claim 1 has been amended to recite that the hydrogen sulfide content in the natural gas is between 20 and 45% by mole. See, e.g., page 3, lines 13-16 of Applicants' specification. Claim 1 has also been amended to recite that, in stage b, the gas phase is cooled to a temperature ranging from -40°C to 0°C. See, e.g., page 6, lines 3-5. Claim 1 has further been amended to recite that, in stage c, the contacting is done at a temperature ranging between -40°C and 0°C. See, page 6, lines 19-22 of Applicants' specification. Claim 2 has been amended to be consistent with claim 1 and claims 7 and 10 canceled without prejudice or disclaimer.

Applicants transverse the finality of the outstanding Office Action. The outstanding Office contains new ground of objection and rejection not necessitated by amendment. In particular, in numbered section 1 of the Office Action, the Examiner now objects to the drawings under 37 CFR 1.83(a) as allegedly not showing the features recited in claims 7 and 10. Since claim 7 was an original claim and was not amended in the last amendment, the objection to the drawings as not showing the features recited in claim 7 cannot have been necessitated by amendment. Moreover, to the extent the Examiner deemed the rejections in paragraphs 3 and 4 to be proper, it is not seen how the amendments could have necessitated the new grounds of rejection in numbered sections 5 and 6.

For the foregoing reasons, it is submitted the new grounds of objection and rejection were not necessitated by amendment and, therefore, the finality of the outstanding Office Action is premature. Therefore, withdrawal of the finality of the

outstanding Office Action and entry of this amendment are requested.

In view of the cancellation of claims 7 and 10, the objection to the drawings in numbered section 1 of the Office Action is moot.

Claims 1-5 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0104438A1 (Cadours et al.) in view of U.S. Patent Publication No. 2002/0062735A1 (Lecomte et al.). Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to a method for treating a natural gas containing hydrocarbons, between 20 and 45% by mole hydrogen sulfide, and water.

According to the present invention, the following stages are carried out: a) cooling the natural gas so as to condense water and recovery gaseous effluent, b) distilling the gaseous effluent obtained in stage a) so as to obtain a liquid phase and a gas phase, and cooling the gas phase to a temperature ranging from -40°C and 0°C so as to obtain a condensate and a gaseous effluent depleted in hydrogen sulfide and in water, and c) contacting at least part of the gaseous effluent obtained in stage b) with a first physical solvent so as to obtain a liquid effluent and a treated gas depleted in hydrogen sulfide. As now set forth in claim 1, stage c) is carried out at a temperature ranging between -40°C and 0°C .

The Cadours et al. publication discloses a process using two absorption sections for treating a natural gas containing carbon dioxide and hydrogen sulfide as well as mercaptans, COS and/or CS_2 . According to Cadours et al., the process includes washing the gaseous hydrocarbons desorbed upon expansion of the solvent from the first absorption section with the solvent from the second absorption section. In paragraph 0046, it is disclosed that the temperature of the solvents

introduced through lines 6-8 can range between 20 and 70°C. On the other hand, according to the present invention, the gas is contacted with a physical solvent at a temperature ranging between -40°C and 0°C.

By contacting, at step c) the gaseous effluent with a physical solvent at low temperature (between -40°C and 0°C), the gaseous effluent will be depleted in hydrogen sulfide without being charged in water. The gaseous effluent, depleted in hydrogen sulfide, is depleted in water although the physical solvent is an aqueous solvent, because the contacting at step c) is performed at low temperature. The use of a physical solvent allows working at low temperature (between -40°C and 0°C) without forming hydrates of methane. This is not disclosed in Cadours.

The contact between the hybrid solvent and the natural gas must be performed at a temperature ranging between 20°C and 70°C. Otherwise, the chemical absorption does not work. Therefore one skilled in the art is dissuaded from contacting the natural gas with this hybrid solvent at a temperature ranging between -40°C and 0°C. Furthermore, one skilled in the art can not combine the method of Cadours with the method of a pretreating disclosed by Lecomte et al. because this method works at low temperatures.

The Lecomte et al. publication discloses a process for pretreating a natural gas containing acid gases, but does not remedy the basic deficiencies of Cadours noted above.

Accordingly, it is submitted the presently claimed invention is patentable over the proposed combination of Cadours et al. and Lecomte et al.

Claims 6 and 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cadours et al. in view of Lecomte et al. and further in view of U.S. Patent

Application Publication No. 2002/0059865A1 (Lemaire et al.). Applicants traverse this rejection and request reconsideration thereof.

The Lemaire et al. publication discloses a process for treating a gas containing acid gaseous by absorption in a solvent with temperature control. The Examiner has alleged the Lemaire et al. publication teaches a method for treating an acidic gas comprising the steps of heating the effluent from a column C10 in a heat exchanger E1, separating the heated effluent into gas and liquid phases in separating drum B10, and feeding the gas and liquid phases separately into distillation column D1 for the purpose of regenerating solvents in the effluent. However, clearly the Lemaire et al. document does not remedy any of the deficiencies noted above with respect to the proposed combination of Cadours et al. and Lecomte et al.

Accordingly, claims 6 and 7 are patentable over the proposed combination of references, at least for the reason noted above.

Claims 1-3, 8, 9 and 11-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,102,987 to Gross et al. in view of Lecomte et al. Applicants traverse this rejection and request reconsideration thereof.

The patent to Gross et al. discloses a process for the removal of CO₂ and sulfur compounds from natural gas and raw synthesis gas wherein N-formylmorpholine and N-acetylmorpholine mixtures are used as the desorbent at temperatures between -20°C and +40°C at pressures of 10 to 150 bar in a scrubbing operation. The acid gases are removed from the absorbent by flashing and the regenerated absorbent is recycled to the absorbent.

As recognized by the Examiner, the patent to Gross et al. fails to disclose that

the natural gas is first cooled so as to condense water and to recovery gaseous effluent, which is then distilled to obtain a liquid phase in the gas phase, the gas phase being cooled so as to obtain a condensate and a gaseous effluent depleted in hydrogen sulfide and water. However, the Examiner alleges that it would have been obvious to do so in view of the teachings of Lecomte et al. However, the Gross et al. patent discloses that the process described therein is especially suited to industrial gases with a high acid gas content of 10 to 90 mole %. In view of this, it is submitted that one of ordinary skill of the art would not complicate the process of Gross et al. with that of Lecomte et al., i.e., to include a pretreatment, since the process of Gross et al. is already disclosed to be sufficient to treat industrial gaseous with a high acid gas content.

Moreover, the present invention is a method for treating a natural gas containing between 20 and 45% by mole hydrogen sulfide. It is submitted that one skilled in the art would not have been motivated by either the teachings of Gross et al. or Lecomte et al. to modify the process of Gross et al. to obtain a process well suited for natural gas containing a large amount of hydrogen sulfide.

For the foregoing reasons, the presently invention is patentable over the proposed combination of Gross et al. and Lecomte.

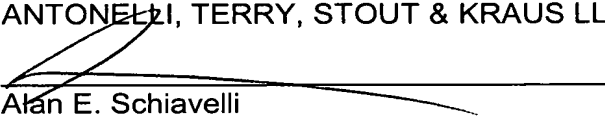
In view of the cancellation of claim 10, the rejection in numbered section 6 of the Office Action is moot.

In view of the foregoing amendments and remarks, withdrawal of the finality of the outstanding Office Action, entry of this amendment and favorable reconsideration and allowance of all of the claims now in the application are requested.

Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus Deposit Account No. 01-2135 (Case: 612.43268X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS LLP



Alan E. Schiavelli
Registration No. 32,087

AES/at
(703) 312-6600
Attachments